

REMARKS

Claims 1 and 25 have been amended to recite that (i) the chromate waste liquid also contains a zinc component, (ii) stirring upon addition of a chromium precipitation accelerating agent, to thereby precipitate a chromium component from the chromate waste liquid, (iii) adding an acid to lower the pH of the waste liquid from the first pH to a second pH of 10 or lower and stirring to precipitate a zinc component, and (iv) adding a flocculation agent to achieve sedimentation of the precipitate. Support is found, for example, at page 14, lines 1-17 and by reference to Example 1 at pages 21-23 of the specification.

Claims 6 and 11 have been amended to conform to the amendment to claim 1. New claims 28 to 34 further characterize the claimed process in terms of pH, stirring time, acid component and specific flocculation agent.

As recited in new independent claim 35, the claimed process comprises adding Ca(OH)_2 to the chromate waste liquid and adjusting the pH of the chromate waste liquid to precipitate a chromium component and zinc component from the waste liquid. Claims 36 and 37 depending primarily or secondary from claim 35 further characterize a change from the first pH to the second pH, thereby decreasing zinc concentration of the waste liquid.

Claim 22 was canceled in the Amendment filed March 9, 2004 and is not pending.

Review and reconsideration on the merits are requested.

Claims 1-3, 6, 9, 10, 12-17, 20, 21, 23 and 24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 4,260,491 to Cassidy et al in view of U.S. Patent 6,607,651 to Stiller or U.S. Patent 5,330,658 to Grant et al.

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The Examiner considered Cassidy et al as disclosing a process for treating a chromate waste liquid containing an organic component substantially as claimed, except for adding a chromium precipitation accelerating agent comprising a calcium component so as to increase the pH of the waste liquid to 10.3 or higher. The Examiner relied on Stiller and Grant et al as teaching that it is known to utilize a calcium component of pH of 9-13 or 9-12, respectively, to precipitate chromium from waste liquid. The reason for rejection was that it would have been obvious to modify the method of Cassidy et al by adding a calcium component and to further utilize the pH as taught by Stiller or Grant et al, so as to aid in removing chromium from the waste liquid.

Applicants traverse, and respectfully request the Examiner to reconsider in view of the amendment to the claims and the following remarks.

In the Declaration Under 37 C.F.R. § 1.132 filed March 9, 2004, Applicants submitted test data showing that increasing the pH of the chromate waste liquid to a first pH of 10.3 or higher unexpectedly increased sedimentation of Cr. Considering that the highest pH used by Cassidy et al was 8.9, there is nothing in Cassidy et al that teaches or suggests the improvements obtained by use of calcium hydroxide in combination with a first pH adjustment of at least 10.3.

The Examiner considered the test data as not being commensurate in scope with the claimed invention. However, the Examiner did consider claim 1 (and claim 25) to be allowable if amended to include the specific conditions employed in Example 1 (stirring time of 30 minutes, addition of sulfuric acid to adjust the pH to 8, flocculation with polyacrylamide, and sedimentation of the precipitated chromium).

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In this regard, it is respectfully submitted that claims 1 and 25 have been amended such that the test data is fully representative and commensurate in scope with the claimed invention. The claims have been amended to include the step of adding an acid to lower the pH of the waste liquid. The subject limitation itself recites the desired end result, such that it is unnecessary to specifically recite sulfuric acid or a pH of about 8. Similarly, claims 1 and 25 have been amended to recite adding a flocculation agent to achieve sedimentation of the precipitate. There is no need to limit to polyacrylimide, because the subject limitation recites the desired end result, namely, "to achieve sedimentation of the precipitate".

Additionally, the test data is fully commensurate in scope with the invention as claimed, because (1) the step of increasing the pH to 10.3 or higher is a critical step for achieving the effects of the invention, and (2) sedimentation of the precipitate (by adding an acid and then a flocculation agent) provides for achieving sedimentation of the precipitate, but does not have anything to do with precipitating chromium in the first instance.

The amended claims are separately patentable over the cited prior art for additional reasons, as follows.

Particularly, none of the cited references disclose that the Cr treatment is conducted at a first pH and then the Zn treatment is conducted at a second pH, which is lower than the first pH. That is, the pH ranges for the Cr treatment, which are disclosed by Cassidy et al, Stiller and Grant et al overlap with the pH range for the Zn treatment of U.S. Patent 3,575,853 to Gaughan et al (of record). Therefore, one skilled in the art would consider that it suffices to treat both Cr and Zn at one time in the overlapped pH range. For this additional reason, Applicants

respectfully submit that the claimed process requiring a first pH of 10.3 or higher and a second pH of 10 or lower for treating Cr and Zn, respectively, of claims 1 and 25 is unobvious over the cited references, considered alone or in combination thereof.

In summary, it is respectfully submitted that the rejection constitutes hindsight reconstruction because it relies on the teachings of Applicants' specification.

Applicants further comment on new claims 35 to 37 as follows.

As required by claim 35, the chromate waste liquid containing Cr and Zn is treated with Ca(OH)_2 , and the pH is maintained at 10.3 or higher by controlling the amount of Ca(OH)_2 . In contrast, none of Cassidy et al, Stiller, Grant et al, Gaughan et al and U.S. Patent 5,908,559 to Kreisler (of record) discloses that both Cr and Zn are precipitated by the addition of Ca(OH)_2 and that the pH is maintained at 10.3 or higher by Ca(OH)_2 . Therefore, it is respectfully submitted that the process as claimed in new claim 35 is unobvious over the cited references, alone or in combination thereof.

Claims 7 and 25-27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Cassidy et al in view of Stiller or Grant et al, further in view of U.S. Patent 5,908,559 to Kreisler. The Examiner relied on Kreisler as disclosing that it is known in the art to add calcium chloride in combination with sodium and calcium hydroxide, to aid in precipitating and removing chromium from a waste stream.

Claims 8 and 25-27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Cassidy et al in view of Stiller or Grant et al, further in view of U.S. Patent 4,846,948 to Leggett et al. The Examiner relied on Leggett et al as disclosing that it is known in the art to add

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magnesium chloride and sodium hydroxide to a waste stream to precipitate and remove chromium.

Claim 11 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Cassidy et al in view of Stiller or Grant et al, further in view of U.S. Patent 3,575,853 to Gaughan et al. The Examiner relied on Gaughan et al as disclosing it is known in the art to add calcium and magnesium components to precipitate and remove chromium and zinc from a waste stream.

Claims 18 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Cassidy et al in view of Stiller or Grant et al and Leggett et al, further in view of U.S. Patent 5,951,865 to Heskett. The Examiner relied on Heskett as disclosing that it is known in the art to utilize ion exchange or reverse osmosis to aid in removing magnesium from water systems.

Applicants rely on the response above with respect to the rejection of claims 1-3, 6, 9, 10, 12-17, 20, 21, 23 and 24 over Cassidy et al in view of Stiller or Grant et al. Applicants further comment as follows.

Kreisler does not disclose increasing the pH to a first pH of 10.3 or higher. Legget et al likewise fails to disclose the critical step of increasing the pH of the chromate waste liquid to have a first pH of 10.3 or higher as claimed. Rather, Legget et al adjust the pH to about 9.5 (col. 1, lines 55-56). In short, none of the secondary references adversely affects the patentability of the amended claims presented herein.

Withdrawal of all rejections and allowance of claims 1-3, 6-21 and 23-37 is earnestly solicited.

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In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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